

WHAT IS CLAIMED IS:

1. An exhaust gas flow circuit for reducing pressure in an exhaust system of an internal combustion engine, comprising:
 - 5 a pumping unit including an inlet in fluid communication with an outlet of a forward portion of the exhaust system, and an outlet in fluid communication with an inlet of a rearward portion of the exhaust system, said pumping unit selectively pumping exhaust gas from the forward portion to the rearward portion of the exhaust system; and
 - 10 a power source driving said pumping unit.
2. The flow circuit of claim 1, further comprising:
 - a bypass passage arranged in parallel flow relation with said pumping unit between said pumping unit inlet and outlet; and
 - 15 a bypass valve for opening said bypass passage and providing a flow path for exhaust gas from the forward portion to the rearward portion of the exhaust system in parallel with said pumping unit, and for closing said bypass passage to prevent exhaust gas flow therethrough.
- 20 3. The flow circuit of claim 2, wherein said bypass valve opens said bypass passage when a mass flow rate of exhaust gas in the exhaust system is relatively high and closes said bypass passage when the mass flow rate of exhaust gas is relatively low.
4. The flow circuit of claim 2, wherein said bypass valve is located in said
25 bypass passage.
5. The flow circuit of claim 1, wherein said pumping unit is one of a gas compressor and a gas pump.
- 30 6. The flow circuit of claim 1, wherein the exhaust system further includes an exhaust manifold for carrying exhaust gas from the engine to the forward portion of the exhaust system, a catalytic converter located in the forward portion upstream from said

pumping unit inlet, and a discharge pipe located in the rearward portion of the exhaust system and communicating with said pumping unit outlet for carrying exhaust gas to an outlet of the exhaust system.

5 7. The flow circuit of claim 1, wherein the engine includes an intake system that is naturally aspirated.

8. The flow circuit of claim 1, wherein said power source is an electric motor.

10 9. A decharge unit containing a flow circuit for reducing pressure in the exhaust system of an internal combustion engine, comprising:

a housing;

a pumping unit located in said housing, said pumping unit including an inlet in
fluid communication with a forward portion of the exhaust system, and an
15 outlet in fluid communication with a rearward portion of the exhaust
system, said pumping unit pumping exhaust gas from the forward portion
to the rearward portion; and

a power source located in said housing and driveably connected to said pumping
unit.

20

10. The decharge unit of claim 9, further comprising:

a bypass passage arranged in parallel flow relation with said pumping unit
between said inlet and outlet; and

a bypass valve for opening said bypass passage and providing a flow path for
25 exhaust gas between said inlet and outlet in parallel with said pumping
unit, and for closing said bypass passage.

11. The decharge unit of claim 10, wherein said bypass valve opens said bypass passage when a mass flow rate of exhaust gas in the exhaust system is relatively high and closes said bypass passage when the mass flow rate of exhaust gas is relatively low.

5 12. The decharge unit of claim 9, wherein said pumping unit is one of a gas compressor and a gas pump.

10 13. The decharge unit of claim 9, wherein the exhaust system further comprises:
an exhaust manifold for carrying exhaust gas from the engine to the forward
portion of the exhaust system;
a catalytic converter located in the forward portion of the exhaust system
upstream from said pumping unit inlet; and
a discharge pipe located in the rearward portion of the exhaust system for
communicating with said pumping unit outlet to carry exhaust gas from
15 said pumping unit outlet.

14. The decharge unit of claim 9, wherein the engine includes an intake system that is naturally aspirated.

20 15. The decharge unit of claim 9, wherein said power source is an electric motor.

25 16. An exhaust gas system for an internal combustion engine, comprising:
an exhaust manifold for carrying exhaust gas from the engine;
a catalytic converter communicating with said exhaust manifold;
a housing located downstream from said catalytic converter;
a pumping unit located in said housing, said pumping unit including an inlet in
fluid communication with said catalytic converter and an outlet, said
pumping unit pumping exhaust gas from said catalytic converter to said
outlet; and
30 a power source located in the housing and driveably connected to said pumping
unit.

17. The exhaust gas system of claim 16, further comprising:

- a bypass passage arranged in parallel flow relation with said pumping unit between said inlet and outlet; and
- a bypass valve for opening said bypass passage and providing a flow path for exhaust gas between said inlet and outlet in parallel with said pumping unit, and for closing said bypass passage.

5